

AUSTRALIA
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PATENT REQUEST : STANDARD PATENT

I/We, being the person(s) identified below as the Applicant(s), request the grant of a Standard Patent to the person(s) identified below as the Nominated Person(s), for an invention described in the accompanying complete specification.

**Applicant(s) and
Nominated Person(s):** L'ORÉAL

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FRANCE

Inv ntion Title: NANOEMULSION BASED ON NONIONIC AMPHIPHILIC
LIPIDS AND AMINATED SILICONES AND USES

**Name(s) of Actual
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BASIC CONVENTION APPLICATION DETAILS

Application No:	Country:	Application Date:
97-03283	FR	18 March 1997

DATED: 4 March 1998

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NOTICE OF ENTITLEMENT

I/We L'ORÉAL

of 14, RUE ROYALE
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FRANCE

being the applicant(s) in respect of an application for a patent for an invention entitled
NANOEMULSION BASED ON NONIONIC AMPHIPHILIC LIPIDS AND AMINATED
SILICONES AND USES, state the following:

1. The nominated person(s) has/have, for the following reasons, gained entitlement from the actual inventor(s):

THE NOMINATED PERSON WOULD BE ENTITLED TO HAVE
ASSIGNED TO IT A PATENT GRANTED TO ANY OF THE
ACTUAL INVENTORS IN RESPECT OF THE SAID
INVENTION.

2. The nominated person(s) has/have, for the following reasons, gained entitlement from the basic applicant(s) listed on the patent request:

THE APPLICANT AND NOMINATED PERSON IS THE BASIC
APPLICANT.

3. The basic application(s) listed on the request form is/are the first application(s) made in a Convention country in respect of the invention.

DATE: 4 March 1998

L'ORÉAL

GRIFFITH HACK
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Patent Attorney for and
on behalf of the applicant(s)



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NANOEMULSION BASED ON NONIONIC AMPHIPHILIC LIPIDS AND AMINATED SILICONES AND USES

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(57) Claim

1. Oil-in-water emulsion comprising an oily phase dispersed in an aqueous phase, whose oil globules have a mean size of less than 150 nm, characterized in that it comprises at least one oil, at least one aminated silicone and an amphiphilic lipid phase which comprises at least one nonionic amphiphilic lipid which is liquid at an ambient temperature of less than 45°C, and in that the weight ratio of the quantity of oily phase to the quantity of amphiphilic lipid phase is between 2 and 10.

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COMPLETE SPECIFICATION
STANDARD PATENT

Applicant(s):

L'ORÉAL

Invention Title:

NANOEMULSION BASED ON NONIONIC AMPHIPHILIC LIPIDS AND AMINATED
SILICONES AND USES

The following statement is a full description of this
invention, including the best method of performing it known to
me/us:

NANOEMULSION BASED ON NONIONIC AMPHIPHILIC LIPIDS AND
ANIMATED SILICONES AND USES

5 The present invention relates to an oil-in-water
emulsion whose oil globules have a mean size of less than
150 nm and which comprises at least one oil, at least one
aminated silicone and an amphiphilic lipid phase based on
nonionic amphiphilic lipids which are liquid at an ambient
temperature of less than 45°C, as well as to their use, as
10 a topical application, particularly in the cosmetic and
dermopharmaceutical fields.

According to the invention, nanoemulsions refer
to emulsions whose oil globules have a mean size of less
15 than 150 nm (nanometres).

Oil-in-water emulsions are well known in the
cosmetic and dermopharmaceutical field particularly for the
preparation of cosmetic products such as lotions, tonics,
20 sera and toilet water.

However, the presence of high concentrations of
vegetable, animal or mineral oils in some compositions
makes their formulation difficult. Indeed, the
25 compositions are generally unstable during storage and the
cosmetic properties are inadequate. In particular, the
application of such compositions to the hair leads to a
greasy feel and difficulty in rinsing. Furthermore, the
dried hair lacks volume and has a charged feel.

30 Nanoemulsions comprising an amphiphilic lipid
phas consisting of phospholipids, a cationic lipid, water
and a hydrophobic sunscr en ar known in the state of the
art.

PALM

They are obtained by a high-pressure homogenization process. These emulsions have the disadvantage of being unstable during storage at the traditional storage temperatures, namely between 0 and 45°C. They lead to yellow compositions and produce rancid odours which develop after a few days of storage. Furthermore, these emulsions do not provide good cosmetic properties. They are described in the "DCI" review of April 1996, pages 46-48.

The Applicant has discovered, unexpectedly, new emulsions whose oil globules have a mean size of less than 150 nm and which are stable during storage between 0 and 45°C after at least one month. The emulsions in accordance with the invention are prepared at temperatures between 20 and 45°C and are compatible with heat-sensitive active agents. They may contain large quantities of oil. They may in particular contain large quantities of perfume and may enhance their persistence. They also promote the penetration of active agents into the top layers of the skin and the deposition of active agent on keratinous fibres such as hair. Hair treated with these emulsions is sleek and glossy without having a greasy feel or appearance, it disentangles easily and is soft and light.

The subject of the present invention is oil-in-water emulsions comprising an oily phase dispersed in an aqueous phase, having oil globules whose mean size is less than 150 nm, characterized in that they comprise at least one oil, at least one aminated silicone and an amphiphilic lipid phase which comprises at least one nonionic amphiphilic lipid which is liquid at an ambient temperature of less than 45°C, and in that the weight ratio of the quantity of oily phase to the quantity of amphiphilic lipid phase is between 2 and 10, preferably from 2 to 8, and more particularly from 2 to 6.

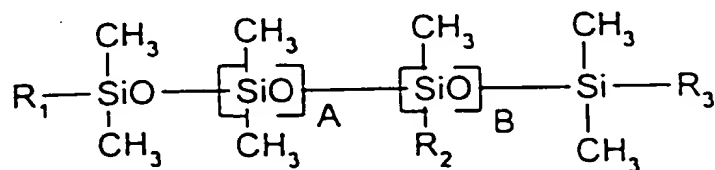
Advantageously, the ratio by weight of the quantity of oily phase in these emulsions to the amphiphilic lipid phase varies from 1 to 10, and preferably from 2 to 8.

Advantageously, the aminated silicone is present at a concentration of between 0.05 and 10% by weight relative to the total weight of the emulsion, preferably between 0.1 and 5% by weight.

The nonionic amphiphilic lipids of the invention are preferably chosen from silicone surfactants and esters of at least one polyol chosen from the group formed by polyethylene glycol containing from 1 to 60 ethylene oxide units, sorbitan, glycerol containing from 2 to 30 ethylene oxide units, polyglycerols containing from 2 to 15 glycerol units, and of at least one fatty acid containing at least one saturated or unsaturated, linear or branched C_8 - C_{22} alkyl chain. It is also possible to use mixtures of the above compounds.

The silicone surfactants which can be used according to the invention are silicone compounds containing at least one oxyethylenated chain $-OCH_2CH_2-$ and/or oxypropylenated chain $-OCH_2CH_2CH_2-$. As silicone surfactants which can be used according to the present invention, there may be mentioned those described in the documents US-A-5,364,633 and US-A-5,411,744.

Preferably, the silicone surfactant used according to the present invention is a compound of formula (I):



(I)

in which:

R_1 , R_2 and R_3 , independently of each other, represent a C_1 - C_6 alkyl radical or a radical $-(CH_2)_x-(OCH_2CH_2)_y-(OCH_2CH_2CH_2)_z-OR_4$, at least one R_1 , R_2 or R_3 radical not being an alkyl radical; R_4 being hydrogen, an alkyl radical or an acyl radical;

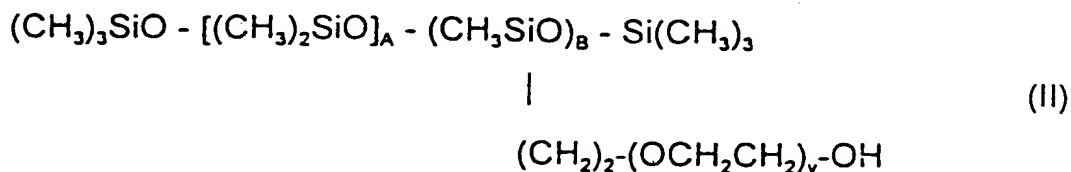
A is an interger ranging from 0 to 200; B is an interger ranging from 0 to 50; provided that A and B are not simultaneously equal to zero;

x is an interger ranging from 1 to 6; y is an interger ranging from 1 to 30;

z is an interger ranging from 0 to 5.

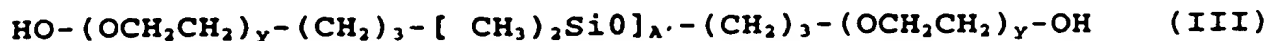
According to a preferred embodiment of the invention, in the compound of formula (I), the alkyl radical is a méthyl radical, x is an integer ranging from 2 to 6 and y is an integer ranging from 4 to 30.

There may be mentioned, by way of example of silicone surfactants of formula (I), the compounds of formula (II):



in which A is an integer ranging from 20 to 105, B is an integer ranging from 2 to 10 and y is an integer ranging from 10 to 20.

It is also possible to mention, by way of example of silicone surfactants of formula (I), the compounds of formula (III):



5 in which A' and y are, each independently of each other, an integer ranging from 10 to 20.

It is also possible to use as compounds of the invention those marketed by the company Dow Corning under
10 the names DC 5329, DC 7439-146, DC 2-5695 and Q4-3667. The compounds DC 5329, DC 7439-146, DC 2-5695 are compounds of formula (II) where, respectively, A is about 22, B is about 2 and y is about 12; A is about 103, B is about 10 and y is about 12; A is about 27, B is about 3 and y is about 12.

15

The compound Q4-3667 is a compound of formula (III) where A is about 15 and y is about 13.

20 Among the nonionic amphiphilic lipids, there may be mentioned more particularly, by way of example:

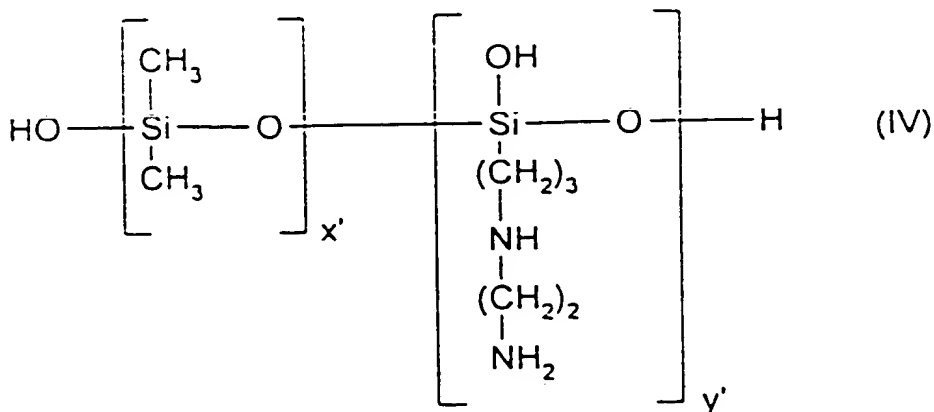
- polyethylene glycol isostearate (having about 8 ethylene glycol units) of molecular weight about 400,
- diglyceryl isostearate,
- polyglycerol laurate containing about 10 glycerol units,
- 25 - sorbitan oleate,
- sorbitan isostearate,
- α -butylglucoside cocoate or α -butylglucoside caprate.

30 According to an essential characteristic of the compositions in accordance with the invention, the emulsions contain at least one aminated silicone.

Throughout the following or preceding text, silicone or polysiloxane are intended to designate, in accordance with what is generally accepted, any organosilicon-containing polymer or oligomer with a
5 branched or cross-linked, linear or cyclic structure, of variable molecular weight, which are obtained by polymerization and/or polycondensation of suitably functionalized silanes, and which essentially consist of a repetition of principal units in which the silicon atoms
10 are linked to each other by oxygen atoms (siloxane bond $\equiv \text{Si-O-Si} \equiv$), optionally substituted hydrocarbon radicals being directly linked via a carbon atom on the said silicon atoms. The most common hydrocarbon radicals are alkyl radicals, particularly C_1 - C_{10} and in particular methyl,
15 fluoroalkyl radicals, aryl radicals and in particular phenyl, and alkenyl radicals and in particular vinyl; other types of radicals capable of being linked, either directly or via a hydrocarbon radical, to the siloxane chain are particularly hydrogen, halogens and in particular chlorine,
20 bromine or fluorine, thiols, alkoxy radicals, polyoxyalkylene (or polyether) radicals and in particular polyoxyethylene and/or polyoxypropylene, hydroxyl or hydroxyalkyl radicals, amide groups, acyloxy or acyloxyalkyl radicals, amphoteric or betaine groups,
25 anionic groups such as carboxylates, thioglycolates, sulphosuccinates, thiosulphates, phosphates and sulphates, this list of course not being at all limiting (so-called "organomodified" silicones).

30 According to the invention, aminated silicone designates any silicone comprising at least one primary, secondary or tertiary amine or a quaternary ammonium group. There may thus be mentioned:

(a) the polysiloxanes called in the CTFA dictionary "amodimethicone" and corresponding to the formula:



in which x' and y' are integers depending on the molecular weight, generally such that the said weight-average molecular weight is between about 5000 and 500,000;

(b) the aminated silicones corresponding to the formula:



in which:

G is a hydrogen atom or a phenyl, OH, or $\text{C}_1\text{-C}_8$ alkyl, for example methyl, group,

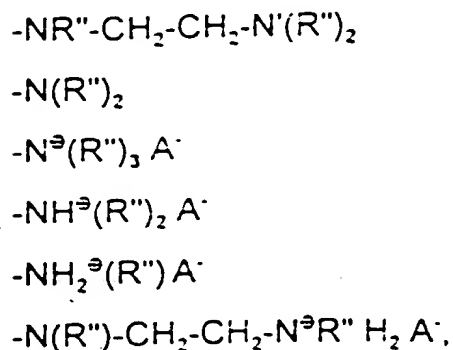
a designates the number 0 or an integer from 1 to 3, in particular 0,

b designates 0 or 1, and in particular 1,

m and n are numbers such that the sum $(n + m)$ may vary in particular from 1 to 2000 and in particular from 50 to 150, it being possible for n to designate a number from 0 to

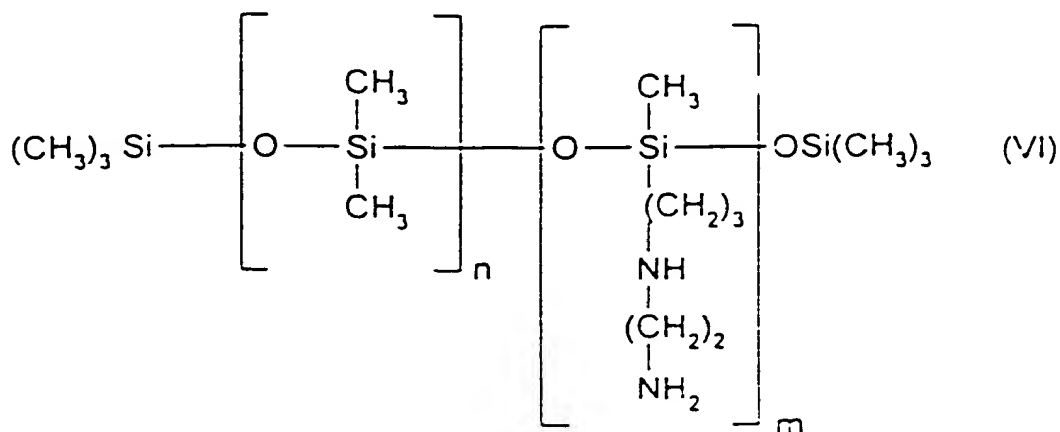
1999 and in particular from 49 to 149 and it being possible for m to designate a number from 1 to 2000, and in particular from 1 to 10;

R' is a monovalent radical of formula $-C_qH_{2q}L$ in which q is a number from 2 to 8 and L is an optionally quaternized amine group chosen from the groups:



in which R'' may designate hydrogen, phenyl, benzyl or a monovalent saturated hydrocarbon radical, for example an alkyl radical having from 1 to 20 carbon atoms and A⁻ represents a halide ion such as for example fluoride, chloride, bromide or iodide.

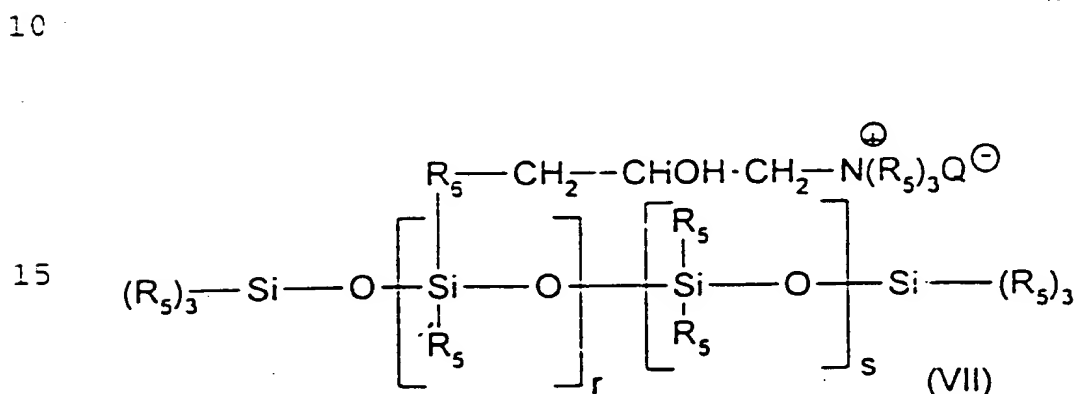
A product corresponding to this definition is the silicone called "trimethylsilylamodimethicone", corresponding to the formula:



in which n and m have the meanings given above (cf formula V).

Such polymers are described for example in Patent
5 Application EP-A-95238.

(c) the aminated silicones corresponding to the
formula:



20

in which

25 R_5 represents a monovalent hydrocarbon radical having from 1 to 18 carbon atoms, and in particular a $\text{C}_1\text{--C}_{18}$ alkyl radical, or a $\text{C}_1\text{--C}_{18}$ alkenyl radical, for example methyl;

R_6 represents a divalent hydrocarbon radical, in particular
30 a $\text{C}_1\text{--C}_{18}$ alkylene radical or a divalent $\text{C}_1\text{--C}_{18}$ alkyleneoxy radical, for example $\text{C}_1\text{--C}_8$ linked to Si by an SiC bond;

Q is an anion such as a halide ion, in particular chloride or an organic acid salt (acetate and the like);

35

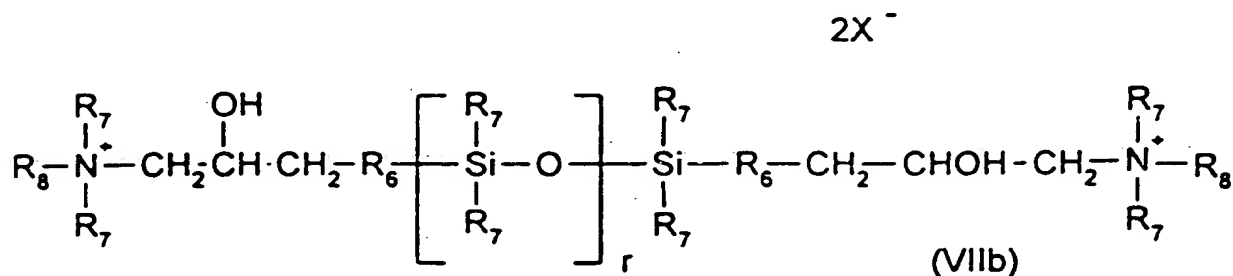
r represents a mean statistical value from 2 to 20, and in particular from 2 to 8;

s r pr sents a mean statistical value from 20 to 200, and in particular from 20 to 50.

Such aminated silicones are described more particularly in Patent US 4,185,087.

A silicone entering into this class is the silicone marketed by the company Union Carbide under the name "Ucar Silicone ALE 56".

d) the quaternary ammonium silicones of formula:



in which

R₇, which are identical or different, represent a monovalent hydrocarbon radical having from 1 to 18 carbon atoms, and in particular a C₁-C₁₈ alkyl radical, a C₂-C₁₈ alkenyl radical or a ring comprising 5 or 6 carbon atoms, for example methyl;

R₆ represents a divalent hydrocarbon radical, in particular a C₁-C₁₈ alkylene radical or a divalent C₁-C₁₈ alkyleneoxy radical, for example C₁-C₈ linked to Si by an SiC bond.

R₈, which are identical or different, represent a hydrogen atom, a monovalent hydrocarbon radical having from 1 to 18 carbon atoms, and in particular a C₁-C₁₈ alkyl radical, a C₂-C₁₈ alkenyl radical, a radical -R₈-NHCOR₇;

X⁻ is an anion such as a halid ion, in particular chloride, or an organic acid salt (acetate and the lik); r represents a mean statistical value from 2 to 200, and in particular from 5 to 100.

5

These silicones are, for example, described in Application EP-A-0,530,974.

10 Silicones entering into this class are the silicones marketed by the company GOLDSCHMIDT under the names ABIL QUAT 3270, ABIL QUAT 3272 and ABIL QUAT 3474.

15 According to the invention, the aminated silicones may be provided in the form of an oil or of aqueous, alcoholic or aqueous-alcoholic solutions, or in the form of a dispersion or emulsion. A particularly advantageous embodiment is their use in the form of emulsions, in particular in the form of microemulsions or nanoemulsions.

20

It is known to use, for example, the product marketed under the name "Emulsion Cationique DC 929" by the company Dow Corning which comprises, in addition to the amodimethicone, a cationic surface-active agent derived from tallow fatty acids called Tallowtrimonium (CTFA), in combination with a nonionic surface-active agent known under the name "Nonoxynol 10".

30 It is also possible to use, for example, the product marketed under the name "Emulsion Cationique DC 939" by the company Dow Corning which comprises, in addition to the amodimethicone, a cationic surface-active agent trimethylcetylammmonium chloride in combination with a nonionic surfac -active agent trideceth-12.

35

Another commercial product which can be used according to the invention is the product marked under the name "Dow Corning Q2 7224" by the company Dow Corning comprising, in combination, the trimethylsilyl-
5 amodimethicone of formula (IV), a nonionic surface-active agent of formula: $C_8H_{17}-C_6H_4-(OCH_2CH_2)_n-OH$ where $n = 40$, also called octoxynol -40,
another nonionic surface-active agent of formula:
 $C_{12}H_{25}-(OCH_2-CH_2)_n-OH$ where $n = 6$, also called isolaureth-6,
10 and glycol.

Advantageously, the aminated silicone is present at a concentration of between 0.05 and 10% by weight relative to the total weight of the emulsion, preferably
15 between 0.1 and 5% by weight, and more particularly from 0.3 to 3% by weight.

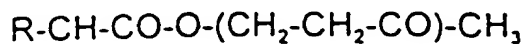
A specific form of emulsion in accordance with the invention is characterized in that the amphiphilic
20 lipid phase additionally comprises one or more ionic amphiphilic lipids.

The ionic amphiphilic lipids used in the emulsions of the invention are chosen from the group formed
25 by anionic lipids, amphoteric lipids and preferably cationic lipids.

The anionic amphiphilic lipids are more particularly chosen from the group formed by:

- 30
- alkyl metal salts of dicetyl- and dimyristylphosphate;
 - alkali metal salts of cholesterol sulphate;
 - alkali metal salts of cholesterol phosphat ;
 - lipoamino acids such as mono- and disodium acyl
35 glutamates;
 - sodium salts of phosphatidic acid;
 - phospholipids;

- alkylsulphonic derivatives such as those of formula:



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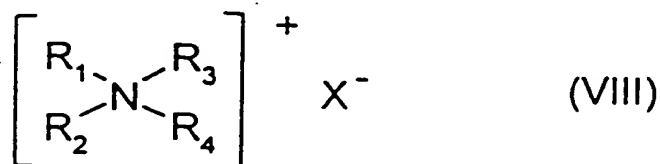


in which R represents $\text{C}_{16}\text{-C}_{22}$ alkyl radicals, in particular $\text{C}_{16}\text{H}_{33}$ and $\text{C}_{18}\text{H}_{37}$ radicals, taken in the form of a mixture or separately, and M is an alkali metal such as sodium.

The cationic amphiphilic lipids used in the emulsions of the invention are preferably chosen from the group formed by quaternary ammonium salts, fatty amines and salts thereof."

The quaternary ammonium salts are for example:

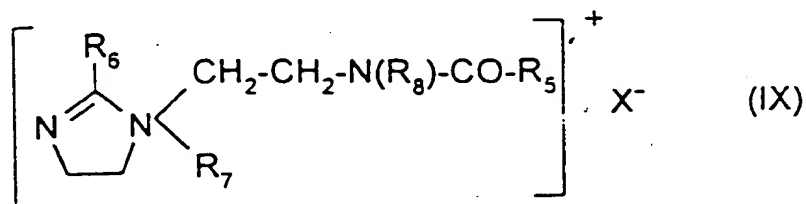
- those which have the following general formula (VIII):



in which the radicals R_1 to R_4 , which may be identical or different, represent a linear or branched aliphatic radical containing from 1 to 30 carbon atoms, or an aromatic radical such as aryl or alkylaryl. The aliphatic radicals may contain heteroatoms such as in particular oxygen, nitrogen, sulphur or halogens. The aliphatic radicals are for example chosen from the alkyl, alkoxy, polyoxy ($\text{C}_2\text{-C}_6$) alkyl ne, alkylamide, ($\text{C}_{12}\text{-C}_{22}$)alkylamido($\text{C}_2\text{-C}_6$)alkyl,

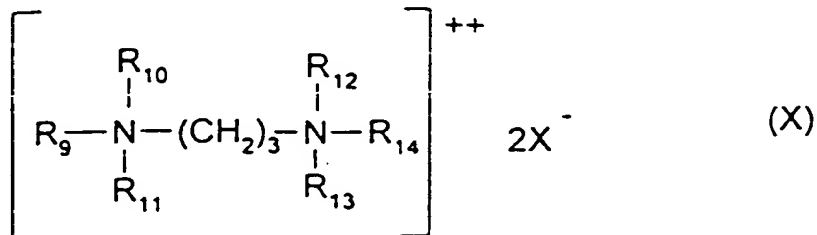
(C₁₂-C₂₂) alkyl acetate or hydroxyalkyl radicals containing from about 1 to 30 carbon atoms; X is an anion chosen from the group comprising halides, phosphates, acetates, lactates, (C₁-C₆) alkyl sulphates and alkyl- or alkylarylsulphonates,

- the quaternary ammonium salts of imidazolinium, such as for example that of the following formula (IX):



in which R₅ represents an alkenyl or alkyl radical containing from 8 to 30 carbon atoms which are for example derived from tallow fatty acids, R₆ represents a hydrogen atom, a C₁-C₄ alkyl radical or an alkenyl or alkyl radical containing from 8 to 30 carbon atoms, R₇ represents a C₁-C₄ alkyl radical, R₈ represents a hydrogen atom, a C₁-C₄ alkyl radical, X is an anion chosen from the group comprising the halides, phosphates, acetates, lactates, alkyl sulphates, alkyl- or alkylarylsulphonates. Preferably, R₅ and R₆ designate a mixture of alkenyl or alkyl radicals containing from 12 to 21 carbon atoms which are for example derived from tallow fatty acids, R₇ designates methyl and R₈ designates hydrogen. Such a product is for example marketed under the name "REWOQUAT W 75" by the company REWO,

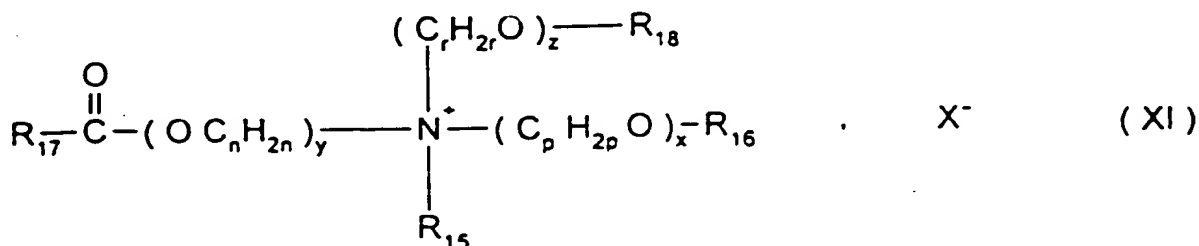
- the quaternary diammonium salts of formula (X):



in which R, designates an aliphatic radical containing from about 16 to 30 carbon atoms, R₁₀, R₁₁, R₁₂, R₁₃ and R₁₄, which are identical or different, are chosen from hydrogen or an alkyl radical containing from 1 to 4 carbon atoms, and X is an anion chosen from the group comprising the halides, acetates, phosphates, nitrate and methyl sulphates. Such quaternary diammonium salts comprise in particular propanetallowdiammonium dichloride,

- the quaternary ammonium salts containing at least one ester functional group.

The quaternary ammonium salts containing at least one ester functional group which can be used according to the invention are for example those of the following formula (XI):



in which:

- R_{15} is chosen from C_1 - C_6 alkyl radicals and C_1 - C_6 hydroxyalkyl or dihydroxyalkyl radicals;

- R_{16} is chosen from:

5

- the radical $R_{19}-\overset{\overset{O}{||}}{C}-$

10

- the saturated or unsaturated, linear or branched C_1 - C_{22} hydrocarbon radicals R_{20} ,

- the hydrogen atom,

- R_{18} is chosen from:

15

- the radical $R_{21}-\overset{\overset{O}{||}}{C}-$

20

-the saturated or unsaturated, linear or branched C_1 - C_6 hydrocarbon radicals R_{22} ,

- the hydrogen atom,

25

- R_{17} , R_{19} and R_{21} , which are identical or different, are chosen from the saturated or unsaturated, linear or branched C_7 - C_{21} hydrocarbon radicals;

30 - n , p and r , which are identical or different, are integers having values from 2 to 6;

- y is an integer having a value from 1 to 10;

35 - x and z , which are identical or different, are integers having values from 0 to 10;

-X⁻ is an organic or inorganic, simpl or complex anion;

with th proviso that the sum $x+y+z$ has a value from 1 to 15, that when x has a value of 0, then R_{16} d signates R_{20} ,
5 and that when z has a value of 0, then R_{18} designates R_{22} .

The alkyl radicals R_{15} may be linear or branched and more particularly linear.

10 Preferably, R_{15} designates a ;methyl, ethyl, hydroxyethyl or dihydroxypropyl radical and more particularly a methyl or ethyl radical.

15 Advantageously, the sum $x+y+z$ has a value from 1 to 10.

When R_{16} is a hydrocarbon radical R_{20} , it may be long and may have from 12 to 22 carbon atoms, or may be short and may have from 1 to 3 carbon atoms.

20 When R_{16} is a hydrocarbon radical R_{22} , it preferably has 1 to 3 carbon atoms.

25 Advantageously, R_{17} , R_{19} and R_{21} , which are identical or different, are chosen from saturated or unsaturated, linear or branched C_{11} - C_{21} hydrocarbon radicals, and more particularly from saturated or unsaturated, linear or branched C_{11} - C_{21} alkyl and alkenyl radicals.

30 Preferably, x and z , which are identical or different, have a value of 0 or 1.

Advantageously, y is qual to 1.

35 Preferably, n , p and r , which are identical or different, have a valu of 2 or 3 and, still mor preferably, are equal to 2.

The anion is preferably a halide (chloride, bromid or iodide) or an alkyl sulphate, more particularly methyl sulphate. It is however possible to use methanesulphonate, phosphate, nitrate, tosylate, an organic acid-derived anion such as acetate or lactate or any other anion compatible with ammonium containing an ester functional group.

The anion X^- is still more particularly chloride or methyl sulphate.

Use is more particularly made of the ammonium salts of formula (XI) in which:

- R_{15} designates a methyl or ethyl radical,
- x and y are equal to 1;
- z is equal to 0 or 1;
- n , p and r are equal to 2;
- R_{16} is chosen from:

- the radical $R_{19}-\overset{\overset{O}{\parallel}}{C}-$

- the methyl, ethyl or $C_{14}-C_{22}$ hydrocarbon radicals
- the hydrogen atom;

- R_{18} is chosen from:

- th radical $R_{21}-\overset{\overset{O}{\parallel}}{C}-$

- the hydrogen atom;

R₁₇, R₁₉ and R₂₁, which are identical or different, are chosen from saturated or unsaturated, linear or branched C₁₃-C₁₇ hydrocarbon radicals and preferably from saturated or unsaturated, linear or branched C₁₃-C₁₇ alkyl and alkenyl radicals.

Advantageously, the hydrocarbon radicals are linear.

There may be mentioned for example the compounds of formula (XI) such as the salts (chloride or methyl sulphate in particular) of diacyloxyethyldimethylammonium, of diacyloxyethylhydroxyethylmethylammonium, of monoacyloxyethyl-dihydroxyethylmethylammonium, of triacyloxyethylmethylammonium, of monoacyloxyethylhydroxyethyldimethylammonium and mixtures thereof. The acyl radicals preferably have 14 to 18 carbon atoms and are more particularly obtained from a vegetable oil such as palm oil or sunflower oil. When the compound contains several acyl radicals, the latter may be identical or different.

These products are obtained for example by direct esterification of triethanolamine, of triisopropanolamine, of alkyldiethanolamine or of alkyl-diisopropanolamine which are optionally oxyalkylenated and of fatty acids or of mixtures of fatty acids of plant or animal origin or by transesterification of methyl esters thereof. This esterification is followed by quaternization with the aid of an alkylating agent such as an alkyl (preferably methyl or ethyl) halide, a dialkyl (preferably methyl or ethyl) sulphate, methyl methanesulphonate, methyl para-toluenesulphonate, or glycol or glycerol chlorohydrin.

Such compounds are for example marketed under the names DEHYQUART by the company HENKEL, STEPANQUAT by the company STEPAN, NOXAMIUM by the company CECA, REWOQUAT WE 18 by the company REWO-WITCO.

Th composition according to the inv ntion preferably contains a mixtur of quaternary ammonium mono-, di- and triester salts, with a majority by weight of diester salts.

As a mixture of ammonium salts, there may be used for example the mixture containing 15 to 30% by weight of acyloxyethyldihydroxyethylmethyllumonium methyl sulphate, 45 to 60% of diacyloxyethyl-hydroxyethylmethyllumonium methyl sulphate and 15 to 30% of triacyloxyethylmethyllumonium methyl sulphate, acyl radicals having from 14 to 18 carbon atoms and obtained from optionally partially hydrogenated palm oil.

It is also possible to use the ammonium salts containing at least one ester functional group which are described in patents US-A-4,874,554 and US-A-4,137,180.

Among the quaternary ammonium salts of formula (VIII), there are preferred, on the one hand, the tetraalkylammonium chlorides such as for example the dialkyldimethylammonium or alkyltrimethylammonium chlorides, in which the alkyl radical contains from about 12 to 22 carbon atoms, in particular the behenyltrimethylammonium, distearyldimethylammonium, cetyltrimethylammonium and benzyldimethylstearyl-ammonium chlorides or alternatively, on the other hand, the stearamidopropyldimethyl(myristyl acetate)ammonium chloride marketed under the name "CERAPHYL 70" by the company VAN DYK.

According to the invention, the behenyltrimethylammonium chlorid is th quarternary ammonium salt most particularly pr ferred.

The amphiphilic ionic lipids are present in the emulsions of the invention preferably in concentrations ranging from 0 to 60% by weight and more particularly from 10 to 50% by weight relative to the total weight of the amphiphilic lipid phase.

Advantageously, the amphiphilic ionic lipids are present in the emulsions of the invention in concentrations ranging from 0 to 10% by weight, preferably from 0.05 to 5% by weight, and more particularly from 0.5 to 3% by weight relative to the total weight of the emulsion.

The emulsions in accordance with the invention contain a quantity of oil preferably ranging from 5 to 40% by weight relative to the total weight of the emulsion and more particularly from 8 to 30% by weight.

The oils which can be used in the emulsions of the invention are preferably chosen from the group formed by:

- the animal or vegetable oils formed by esters of fatty acids and of polyols, in particular liquid triglycerides, for example sunflower, maize, soyabean, avocado, jojoba, gourd, grapeseed, sesame and hazelnut oils, fish oils, glycerol tricaprocaprylate, or vegetable oils or animal oils of formula R_nCOOR_{10} in which R_n represents the residue of a higher fatty acid containing from 7 to 29 carbon atoms and R_{10} represents a linear or branched hydrocarbon chain containing from 3 to 30 carbon atoms, in particular alkyl or alkenyl, for example Purcellin oil or liquid jojoba wax;
- natural or synthetic essential oils such as, for example, eucalyptus, lavandin, lavender, vetiver, litsea cubeba, lemon, sandalwood, rosemary, camomil, savory, nutmeg, cinnamon, hyssop, caraway, orange, geraniol, cade and bergamot oils;

- hydrocarbons such as hexadecan , branched or unbranched and paraffin oil;
- halogenated hydrocarbons, in particular fluorocarbons such as fluoroamines, for example perfluorotributyl-amine,
- 5 fluorinated hydrocarbons, for example perfluorodecahydronaphthalene, fluoroesters and fluoroethers;
- esters of an inorganic acid and an alcohol;
- ethers and polyethers;
- 10 - nonaminated silicones mixed with at least one of the oils defined above, for example decamethylcyclopenta-siloxane or dodecamethylcyclohexasiloxane.

The emulsions in accordance with the present
15 invention may contain additives for enhancing, if necessary, the transparency of the formulation.

These additives are preferably chosen from the group formed by:

- 20 - C₁-C₈ lower alcohols such as ethanol;
- glycols such as glycerin, propylene glycol, 1,3-butylene glycol, dipropylene glycol, polyethylene glycols containing from 4 to 16 ethylene oxide units and preferably from 8 to 12.

25 The additives, such as those mentioned above, are present in the emulsions of the invention in concentrations preferably ranging from 1 to 30% by weight relative to the total weight of the emulsion.

30 In addition, the use of the alcohols as defined above, at concentrations greater than or equal to 5% by weight and preferably greater than 10% by weight makes it possible to obtain emulsions without a preservative.

The emulsions of the invention may contain water-soluble or fat-soluble active agents having a cosmetic or dermatopharmaceutical activity. The fat-soluble active agents are in the oily globules of the emulsion, whereas the water-soluble active agents are in the aqueous phase of the emulsion. There may be mentioned, by way of examples of active agent, vitamins such as vitamin E and derivatives thereof, provitamins such as panthenol, humectants, sunscreens containing silicone or not, surfactants, preservatives, sequestrants, emollients, perfumes, colorants, viscosity-modifying agents, foam-modifying agents, foam stabilizers, pearlescent agents, pigments, moisturizing agents, antidandruff agents, antiseborrheic agents, proteins, silicones, ceramides, pseudoceramides, fatty acids containing linear or branched C_{16} - C_{40} chains such as 18-methyleicosanoic acid, thickeners, plasticizers, hydroxy acids, electrolytes, polymers, in particular cationic polymers, and perfumes.

Among the thickeners which can be used, there may be mentioned cellulose derivatives such as hydroxymethylpropylcellulose, fatty alcohols such as stearyl, cetyl and behenyl alcohols, algal derivatives such as satia gum, natural gums such as tragacanth and synthetic polymers such as the polycarboxyvinyl acid mixtures marketed under the name CARBOPOL by the company GOODRICH and the Na acrylate/acrylamide copolymer mixture marketed under the name HOSTACERIN PN 73 by the company HOECHST.

The oil globules of the emulsions of the invention preferably have a mean size ranging from 30 to 150 nm, more preferably from 40 to 100 nm and still more particularly from 50 to 80 nm.

The emulsions of the invention may be obtained by a process characterized in that the aqueous phase, the oily phase and the amphiphilic lipids are mixed, with vigorous stirring, at an ambient temperature of less than 45°C and in that a high-pressure homogenization is then carried out at a pressure greater than 10^8 Pa and preferably ranging from 12×10^7 to 18×10^7 Pa. Such a process makes it possible to produce, at ambient temperature, nanoemulsions which are compatible with heat-sensitive active compounds and which may contain large quantities of oils and in particular perfumes which contain fatty substances, without denaturing them.

Another subject of the invention consists of a composition for topical use, such as a cosmetic or dermatopharmaceutical composition, characterized in that it consists of an emulsion as defined above or in that it comprises such an emulsion. The invention more particularly relates to hair compositions.

The compositions in accordance with the invention can be used for washing and cleansing keratinous materials such as hair and the skin.

The compositions can for example be used for cleansing or removing make-up from the skin.

The compositions of the invention can more particularly be provided in the form of a shampoo, a rinse-off or leave-in conditioner, compositions for permanent waving, hair straightening, dyeing or bleaching, or alternatively in the form of compositions to be applied before or after dyeing, bleaching, permanent waving or hair straightening or alternatively between the two stages of permanent waving or of hair straightening.

The compositions may also be hairs tting lotions, blow-drying lotions, fixing compositions (lacquers) and hair-styling compositions such as for example gels, or foams. The lotions maybe packaged in various forms, particularly in vaporizers, pump dispensers or in aerosol containers in order to ensure application of the composition in vaporized form or in soap form. Such packaging forms are advisable, for example, when it is desired to obtain a spray, a lacquer or a foam for fixing or treating the hair.

The compositions may also be make-up compositions such as foundations, tinted day creams, mascaras, blushers, yeshadows, lipsticks and nail varnishes.

When the composition according to the invention is packaged in aerosol form in order to obtain a lacquer or an aerosol foam, it comprises at least one propellent which may be chosen from volatile hydrocarbons such as n-butane, propane, isobutane, pentane, chlorinated and/or fluorinated hydrocarbons and mixtures thereof. It is also possible to use, as propellent, carbon dioxide, nitrous oxide, dimethyl ther, nitrogen or compressed air.

Another subject of the invention is the use of the emulsions as defined above as base for treatment and/or make-up and/or make-up removing products for the skin and/or the face and/or the scalp and/or the hair and/or th nails and/or the eyelashes and/or the eyebrows and/or the mucous membranes (for example the lips), such as lotions, sera, milks, creams and toilet water.

Finally, the invention also relates to a nontherapeutic process for treating the skin, the hair, the eyelashes, the eyebrows, the nails, the mucous membranes or to the scalp.

The following examples will make it possible to understand the invention more clearly without, however, exhibiting a limiting character.

EXAMPLES

For Examples 1 and 7, the following procedure is used:

The ingredients are mixed with the aid of a turbine homogenizer and then homogenized with the aid of a Soavi-Niro type high-pressure homogenizer at a pressure of about 1200 bar, in several passes (4 to 8) while maintaining the temperature of the product below about 35°C.

EXAMPLE 1:

A conditioner having the following composition was prepared:

- | | | | |
|---|---|------|-----|
| - | Polyethylene glycol isostearate (8EC) marketed by the company UNICHEMA under the name ESTOL B UCN PEG-400 monoisostéarate BIO | 4.5 | g |
| - | Behenyltrimethylammonium chloride (cationic amphiphilic lipid) | 1.6 | gAI |
| - | Avocado oil | 15 | g |
| - | Amodimethicone is emulsion marketed under the name DC2-8902 by the company DOW CORNING | 1.75 | gAI |

-	Absolote thanol	15	g
-	Glyc rin	5	g
-	Demin raliz d wat r qs	100	g

5 An emulsion is obtained in which the size of the oil globules is about 95 nm.

10 This composition is applied to wet hair. After rinsing with water, the hair thus treated is soft and sleek.

EXAMPLE 2:

15 A conditioner having the following composition was prepared:

20	- Polyethylene glycol isostearate (8EO) marketed by the company UNICHEMA under the name ESTOL B UCN PEG-400 monoisostéarate BIO	4.5 g
	- Behenyltrimethylammonium chloride (cationic amphiphilic lipid)	0.8 gAI
	- Avocado oil	20 g
25	- Polydimethylsiloxane with α,ω -quaternary ammonium groups marketed under the name ABIL QUAT 3474 by the company GOLDSCHMIDT	1.9 gAI
	- Tocopherol acetate	1 g
	- Absolute ethanol	15 g
30	- Glycerin	5 g
	- Demineralized water qs	100 g

35 An emulsion is obtained in which the size of the oil globul s is about 79 nm.

 This composition is appli d to w t hair. The hair thus tr at d is soft, sl k and asy to dis ntangle.

EXAMPLE 3:

5 A conditioner having the following composition
was prepared:

	- Polyethylene glycol isostearate (8EO)		
	marketed by the company UNICHEMA under		
	the name ESTOL B UCN PEG-400		
10	monoisostéarate BIO	4.5	g
	- Behenyltrimethylammonium chloride		
	(cationic amphiphilic lipid)	0.8	gAI
	- Avocado oil	20	g
	- Polydimethylsiloxane with α, ω -quaternary		
15	ammonium groups marketed under the		
	name ABIL QUAT 3272 by the company		
	GOLDSCHMIDT	1	gAI
	- Tocopherol acetate	1	g
	- Absolute ethanol	15	g
20	- Glycerin	5	g
	- Demineralized water qs	100	g

An emulsion is obtained in which the size of the
oil globules is about 62 nm.

25 This composition is applied to wet hair. The
hair thus treated is soft, sleek and easy to disentangle.

30

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EXAMPLE 4:

A conditioner having the following composition
5 was prepared:

10	- Polyethylene glycol isostearate (8EO)		
	marketed by the company UNICHEMA under		
	the name ESTOL B UCN PEG-400		
	monoisostéarate BIO	4.5	g
	- Behenyltrimethylammonium chloride		
	(cationic amphiphilic lipid)	0.8	gAI
	- Liquid jojoba wax	17	g
15	- Polydimethylsiloxane with α,ω -quaternary		
	ammonium groups marketed under the		
	name ABIL QUAT 3474 by the company		
	GOLDSCHMIDT	1.9	gAI
	- Tocopherol acetate	1	g
	- Isohexadecane	3	g
20	- Absolute ethanol	15	g
	- Glycerin	5	g
	- Demineralized water qs	100	g

An emulsion is obtained in which the size of the
25 oil globules is about 79 nm.

This composition is applied to wet hair. The
hair thus treated is soft, sleek and easy to disentangle.

30

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EXAMPLE 5:

5 A conditioner having the following composition
was prepared:

10	- Polyethylene glycol isostearate (8EO) marketed by the company UNICHEMA under the name ESTOL B UCN PEG-400 monoisostéarate BIO	4.5	g
	- Behenyltrimethylammonium chloride (cationic amphiphilic lipid)	1.6	gAI
	- Avocado oil	14	g
15	- Microemulsion of trimethysilyl amodimethicone marketed under the name SM 2115 by the company GENERAL ELECTRIC	1.2	gAI
	- Absolute ethanol	15	g
	- Glycerin	5	g
20	- Demineralized water qs	100	g

An emulsion is obtained in which the size of the
oil globules is about 70 nm.

25 This composition is applied to wet hair. The
hair thus treated is soft, sleek and easy to disentangle.

30

35

EXAMPLE 6:

A conditioner having the following composition
was prepared:

	- Polyethylene glycol isostearate (8EO) marketed by the company UNICHEMA under the name ESTOL B UCN PEG-400		
10	monoisostéarate BIO	4.5	g
	- Behenyltrimethylammonium chloride (cationic amphiphilic lipid)	0.8	Gai
	- Liquid jojoba wax	5.25	g
	- Avocado oil	5.25	g
15	- Polydimethylsiloxane with α,ω -quaternary ammonium groups marketed under the name ABIL QUAT 3272 by the company GOLDSCHMIDT	1	gAI
	Cyclomethicone marketed by the company		
20	DOW CORNING under the name DC245 FLUID	3.5	g
	- Absolute ethanol	15	g
	- Glycerin	5	g
	- Demineralized water qs	100	g

An emulsion is obtained in which the size of the
oil globules is about 48 nm.

This composition is applied to wet hair. The
hair thus treated is soft, sleek and easy to disentangle.

EXAMPLE 7:

5 A conditioner having the following composition
was prepared:

	- Polyethylene glycol isostearate (8EO) marketed by the company UNICHEMA under the name ESTOL B UCN PEG-400		
10	monoisostéarate BIO	4.5	g
	- Behenyltrimethylammonium chloride (cationic amphiphilic lipid)	1.6	Gai
	- Liquid jojoba wax	20	g
	- Polydimethylsiloxane with α,ω -quaternary ammonium groups marketed under the name ABIL QUAT 3474 by the company GOLDSCHMIDT	0.95	gAI
15	Polydimethylsiloxane with α,ω -quaternary ammonium groups marketed under the name ABIL QUAT 3272 by the company GOLDSCHMIDT	0.5	gAI
20	- Tocopherol acetate	1	g
	- Absolute ethanol	15	g
	- Glycerin	5	g
25	- Demineralized water ..qs	100	g

An emulsion is obtained in which the size of the
oil globules is about 54 nm.

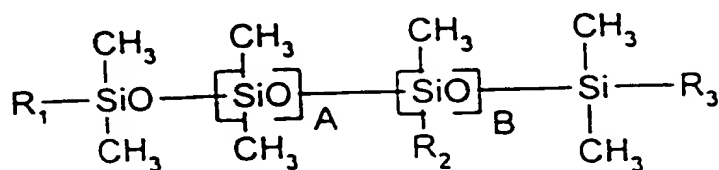
30 This composition is applied to wet hair. The
hair thus treated is soft, sleek and easy to disentangle.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. Oil-in-water emulsion comprising an oily phase dispersed in an aqueous phase, whose oil globules have a mean size of less than 150 nm, characterized in that it comprises at least one oil, at least one aminated silicone and an amphiphilic lipid phase which comprises at least one nonionic amphiphilic lipid which is liquid at an ambient temperature of less than 45°C, and in that the weight ratio of the quantity of oily phase to the quantity of amphiphilic lipid phase is between 2 and 10.

2. Emulsion according to Claim 1, characterized in that the nonionic amphiphilic lipid is chosen from silicone surfactants and esters of at least one polyol chosen from the group formed by polyethylene glycol containing from 1 to 60 ethylene oxide units, sorbitan, glycerol containing from 2 to 30 ethylene oxide units, polyglycerols containing from 2 to 15 glycerol units, and of at least one fatty acid containing at least one saturated or unsaturated, linear or branched C₈-C₂₂ alkyl chain, and mixtures thereof.

3. Emulsion according to Claim 2, characterized in that the silicone surfactant is a compound of formula (I):



(I)

in which:

R_1 , R_2 and R_3 , independently of each other, represent a C_1 - C_6 alkyl radical or a radical $-(CH_2)_x-(OCH_2CH_2)_y-$

($OCH_2CH_2CH_2$),-OR₄, at least one R_1 , R_2 or R_3 radical not being
5 an alkyl radical; R_4 being hydrogen, an alkyl radical or an acyl radical;

A is an integer ranging from 0 to 200;

B is an integer ranging from 0 to 50; provided that A and B are not simultaneously equal to zero;

10 x is an integer ranging from 1 to 6;

y is an integer ranging from 1 to 30;

z is an integer ranging from 0 to 5.

4. Emulsion according to Claim 2, characterized in
15 that the silicone surfactant is a compound of formula (II):



25 in which A is an integer ranging from 20 to 105, B is an integer ranging from 2 to 10 and y is an integer ranging from 10 to 20.

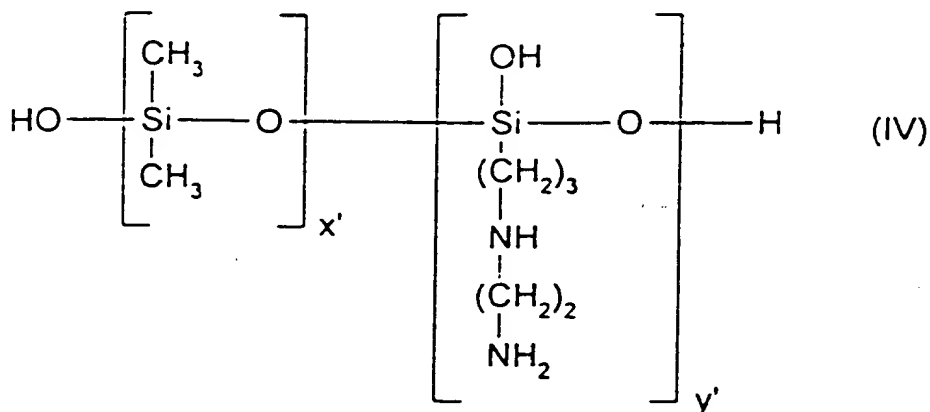
5. Emulsion according to Claim 2, characterized in
30 that the silicon surfactant is a compound of formula (III):



in which A' and y are, each independently of each other, an
35 integer ranging from 10 to 20.

6. Emulsion according to any one of the preceding claims, characterized in that the aminated silicone is chosen from:

- (a) the polysiloxanes called in the CTFA dictionary "amodimethicone" and corresponding to the formula:



in which x' and y' are integers depending on the molecular weight, generally such that the said number-average molecular weight is between 5000 and 500,000;

- (b) the aminated silicones corresponding to the formula:



in which:

G is a hydrogen atom or a phenyl, OH, or C_1 - C_8 alkyl, for example methyl, group,

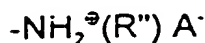
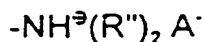
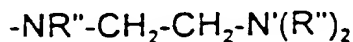
a designates the number 0 or an integer from 1 to 3, in particular 0,

b designates 0 or 1, and in particular 1,

m and n are numbers such that the sum $(n + m)$ may vary in particular from 1 to 2000 and in particular from 50 to 150, it being possible for n to designate a number from 0 to 1999 and in particular from 49 to 149 and it being possible

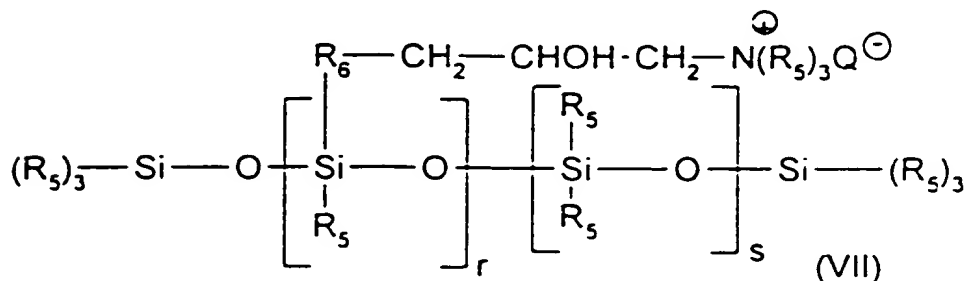
for m to designate a number from 1 to 2000, and in particular from 1 to 10;

R' is a monovalent radical of formula $-C_qH_{2q}L$ in which q is a number from 2 to 8 and L is an optionally quaternized amine group chosen from the groups:



in which R'' may designate hydrogen, phenyl, benzyl or a monovalent saturated hydrocarbon radical, for example an alkyl radical having from 1 to 20 carbon atoms and A⁻ represents a halide ion such as for example fluoride, chloride, bromide or iodide;

c) the aminated silicones corresponding to the formula:



in which:

R_5 represents a monovalent hydrocarbon radical having from 1 to 18 carbon atoms, and in particular a C_1-C_{18} alkyl radical, or a C_2-C_{18} alkenyl radical, for example methyl;

R_6 represents a divalent hydrocarbon radical, in particular a C_1-C_{18} alkylene radical or a divalent C_1-C_{18} alkyleneoxy radical, for example C_1-C_{18} linked to Si by an SiC bond;

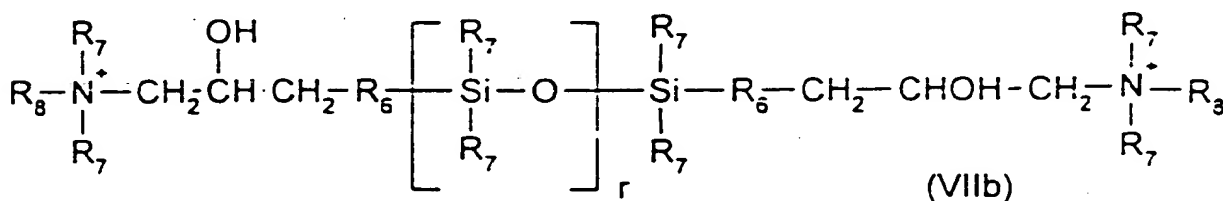
Q^- is an anion such as a halide ion, in particular chloride or an organic acid salt (acetate and the like);

r represents a mean statistical value from 2 to 20, and in particular from 2 to 8;

s represents a mean statistical value from 20 to 200, and in particular from 20 to 50;

d) the quaternary ammonium silicones of formula:

$2X^-$



in which:

R_7 , which are identical or different, represent a monovalent hydrocarbon radical having from 1 to 18 carbon atoms, and in particular a C_1-C_{18} alkyl radical, a C_2-C_{18} alkenyl radical or a ring comprising 5 or 6 carbon atoms, for example methyl;

R_6 represents a divalent hydrocarbon radical, in particular a C_1-C_{18} alkylene radical or a divalent C_1-C_{18} alkyleneoxy radical, for example C_1-C_{18} linked to Si by an SiC bond;

R_8 , which are identical or different, represent a hydrogen atom, a monovalent hydrocarbon radical having from 1 to 18 carbon atoms, and in particular a C_1-C_{18} alkyl radical, a C_2-C_{18} alkenyl radical, a radical $-R_6-NHCOR_7$;

X⁻ is an anion such as a halide ion, in particular chlorid , or an organic acid salt (acetat and the lik); r represents a mean statistical valu from 2 to 200, and in particular from 5 to 100.

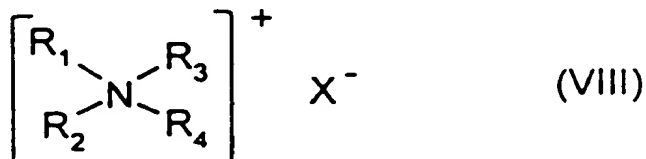
7. Emulsion according to any one of the preceding claims, characterized in that it comprises, in addition, at least one ionic amphiphilic lipid.

8. Emulsion according to the preceding claim, characterized in that the ionic amphiphilic lipid is chosen from the group formed by anionic lipids, amphoteric lipids, cationic lipids and mixtures thereof.

9. Emulsion according to Claim 8, characterized in that the cationic amphiphilic lipid is chosen from the group formed by quaternary ammonium salts and fatty amines.

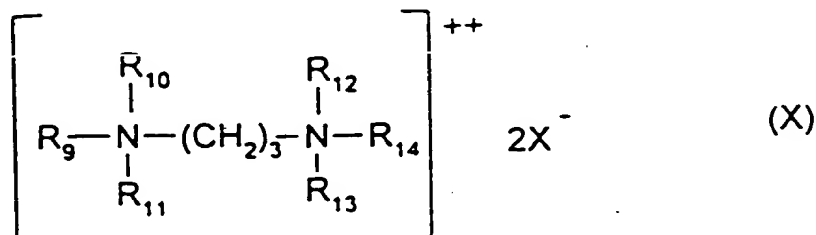
10. Emulsion according to Claim 9, characterized in that the quaternary ammonium salts are chosen from the group formed by:

- the quaternary ammonium salts of the following general formula (VIII):



in which the radicals R₁ to R₄, which may be identical or different, represent a linear or branched aliphatic radical containing from 1 to 30 carbon atoms, or an aromatic radical such as aryl or alkylaryl. X is an anion chosen from th group comprising halid s, phosphates, ac tates, lactat s, (C₁-C₆) alkyl sulphates and alkyl- or alkylarylsulphonates,

- th quaternary ammonium salts of imidazolinium,
- th quaternary diammonium salts of formula (X):



15 in which R₉ designates an aliphatic radical containing from about 16 to 30 carbon atoms, R₁₀, R₁₁, R₁₂, R₁₃ and R₁₄ are chosen from hydrogen or an alkyl radical containing from 1 to 4 carbon atoms, and X is an anion chosen from the group comprising the halides, acetates, phosphates, nitrate and
20 methyl sulphates,

- quaternary ammonium salts containing at least one ester functional group.

11. Emulsion according to any one of Claims 1 to 10,
25 characterized in that the oil is chosen from the group formed by:

- animal or vegetable oils formed by esters of fatty acids and polyols or alternatively vegetable or animal oils of formula R₉COOR₁₀ in which R₉ represents the residue of a
30 higher fatty acid containing from 7 to 29 carbon atoms and R₁₀ represents a linear or branched hydrocarbon chain containing from 3 to 30 carbon atoms;
- natural or synthetic essential oils;
- hydrocarbons;
- 35 - halogenated hydrocarbons;
- esters of an inorganic acid and of an alcohol;
- ethers and polyethers;

- nonaminated silicones mixed with at least one of the oils defined above.

5 12. Emulsion according to any one of the preceding claims, characterized in that the ratio by weight of the quantity of oily phase to the amphiphilic lipid phase varies from 2 to 8 and preferably from 2 to 6.

10 13. Emulsion according to any one of Claims 7 to 12, characterized in that the ionic amphiphilic lipid is present in concentrations ranging from 0 to 60% by weight, relative to the total weight of the amphiphilic lipid phase, and preferably from 10 to 50% by weight.

15 14. Emulsion according to any one of Claims 7 to 12, characterized in that the amphiphilic ionic lipid is present in concentrations ranging from 0 to 10% by weight, preferably from 0.05 to 5% by weight, and more particularly
20 from 0.5 to 3% by weight relative to the total weight of the emulsion.

15. Emulsion according to any one of Claims 1 to 14, characterized in that it comprises a proportion of oil
25 ranging from 5 to 40% by weight relative to the total weight of the emulsion.

16. Emulsion according to any one of Claims 1 to 15, characterized in that the said aminated silicone is present
30 at a concentration of between 0.05 and 10% by weight relative to the total weight of the emulsion, preferably between 0.1 and 5% by weight.

17. Emulsion according to any one of Claims 1 to 16,
35 characterized in that it comprises a water-soluble or fat-soluble cosmetic or dermatopharmacological active agent.

18. Composition for topical use, characterized in that it consists of an emulsion or comprises an emulsion according to any one of Claims 1 to 17.

19. Use of an emulsion as defined according to any one of Claims 1 to 18 as or in treatment and/or washing and/or make-up and/or make-up-removing products for the body and/or the face and/or the mucous membranes and/or the scalp and/or the hair and/or the nails and/or the eyelashes and/or the eyebrows.

20. Process for the nontherapeutic treatment of the skin, the hair, the mucous membranes, the nails, the eyelashes, the eyebrows and/or the scalp, characterized in that an emulsion according to any one of Claims 1 to 17 or a composition according to Claim 18 is applied to the skin, the hair, the mucous membranes, the nails, the eyelashes, the eyebrows or the scalp.

21. Process for preparing an emulsion as defined according to any one of Claims 1 to 17, characterized in that the aqueous phase and the oily phase are mixed, with vigorous stirring, at an ambient temperature of less than 45°C and in that a high-pressure homogenization is then carried out at a pressure greater than 10^5 Pa.

22. Process according to Claim 21, characterized in that the pressure varies from 12×10^7 to 18×10^7 Pa.

Dated this 21st day of May 1998

L'ORÉAL

By their Patent Attorneys

GRIFFITH HACK

Follows Institute of Patent

Attorneys of Australia

DESCRIPTIVE ABSTRACT

NANOEMULSION BASED ON NONIONIC AMPHIPHILIC LIPIDS AND AMINATED SILICONES AND USES

The present application relates to an oil-in-water emulsion whose oil globules have a mean size of less than 150 nm, comprising an amphiphilic lipid phase comprising at least one nonionic amphiphilic lipid which is liquid at an ambient temperature of less than 45°C, at least one oil and at least one aminated silicone, as well as to its uses in the cosmetic or dermatopharmaceutical field.